WHAT IS CLAIMED IS:

1. A method for processing a film over a substrate in a process chamber, the method comprising:

flowing a process gas suitable for processing the film over the substrate into the process chamber in accordance with a predetermined algorithm specifying process conditions;

monitoring a parameter during processing of the film over a thickness greater than 3 μm; and

changing the process conditions in accordance with a correlation among a value of the parameter, an optical property of the film, and the process conditions.

2. The method recited in claim 1 further comprising forming a plasma in the process chamber from the process gas.

3. The method recited in claim 1 wherein monitoring the parameter comprises monitoring the parameter during processing of the film over a thickness greater than 5 μm.

4. The method recited in claim 1 wherein the predetermined algorithm is optimized to control a vertical profile of the film.

5. The method recited in claim 1 wherein the predetermined algorithm is optimized to control a horizontal profile of the film.

6. The method recited in claim 1 wherein changing the process conditions is performed in response to a change in the parameter.

7. The method recited in claim 1 wherein the parameter comprises a process parameter.

8. The method recited in claim 1 wherein the parameter comprises a film-property parameter.

9. The method recited in claim 8 wherein the parameter comprises a reflectometry measurement.

10. The method recited in claim 8 wherein the parameter comprises an ellipsometry measurement.

11. The method recited in claim 1 wherein the parameter comprises a stress uniformity of the film.

12. The method recited in claim 1 wherein changing the process conditions is performed by a trained evaluation system.

13. The method recited in claim 12 wherein the trained evaluation system comprises an expert system.

14. The method recited in claim 12 wherein the trained evaluation system comprises a neural network.

15. The method recited in claim 1 wherein changing the process conditions is performed to maintain a substantially constant value for the optical property of the film throughout processing the film.

16. The method recited in claim 1 wherein changing the process conditions is performed to deposit the film with a desired variation in the optical property of the film throughout processing the film.

17. The method recited in claim 1 wherein the process gas comprises a silicon-containing gas and an oxygen-containing gas.

18. The method recited in claim 1 wherein processing the film comprises depositing the film.

19. The method recited in claim 1 wherein processing the film comprises etching the film.

20. The method recited in claim 1 further comprising annealing the film.

21. A method for forming an optical waveguide over a substrate in a process chamber, the method comprising:

forming a plasma in the process chamber;

flowing a silicon-containing gas and an oxygen-containing gas into the process chamber in accordance with a predetermined algorithm specifying process conditions to deposit a film over the substrate;

monitoring a refractive-index value of the film during deposition of the film over a thickness greater than 3 μm; and

changing the process conditions in accordance with a correlation between the refractive-index value and the process conditions.

22. The method recited in claim 21 wherein monitoring the refractive-index value comprises monitoring the refractive-index value of the film during deposition of the film over a thickness greater than 5 μm.

23. The method recited in claim 21 wherein the predetermined algorithm is optimized to control a vertical profile of the film.

24. The method recited in claim 21 wherein the predetermined algorithm is optimized to control a horizontal profile of the film.

25. The method recited in claim 21 wherein changing the process conditions is performed by a trained evaluation system.

26. The method recited in claim 25 wherein the trained evaluation system comprises an expert system.

27. The method recited in claim 25 wherein the trained evaluation system comprises a neural network.

28. The method recited in claim 21 wherein changing the process conditions is performed to maintain a substantially constant value for the refractive-index value throughout the deposition.

29. The method recited in claim 21 wherein changing the process conditions is performed to deposit the film with a desired variation in the refractive-index value throughout the deposition.

30. The method recited in claim 21 wherein changing the process conditions comprises increasing an RF source power for maintaining the plasma.

31. The method recited in claim 30 wherein the RF source power is increased discretely.

32. The method recited in claim 30 wherein the RF source power is increased continuously.

33. The method recited in claim 21 further comprising annealing the film.

34. A thick-film processing system comprising:

a housing defining a process chamber;

a plasma-generating system operatively coupled to the process chamber;

a substrate holder configured to hold a substrate during substrate processing;

a gas-delivery system configured to introduce gases into the process chamber;

a pressure-control system for maintaining a selected pressure within the process chamber;

a sensor disposed to monitor a parameter during processing within the process chamber;

a controller for controlling the plasma-generating system, the gas-delivery system, the sensor, and the pressure-control system; and

a memory coupled with the controller, the memory comprising a computer-readable medium having a computer-readable program embodied therein for directing operation of the thick-film processing system, the computer-readable program including:

instructions to control the plasma-generating system to form a plasma in the process chamber;

instructions to control the gas-delivery system to flow a process gas suitable for depositing the film over the substrate in accordance with a predetermined algorithm specifying process conditions;

instructions to control the sensor to monitor the parameter during processing of the film over a thickness greater than 3 μm; and

instructions to change the process conditions in accordance with a correlation among a value of the parameter, an optical property of the film, and the process conditions.

35. The thick-film processing system recited in claim 34 wherein the instructions for monitoring the parameter comprise instructions for monitoring the parameter over a thickness greater than 5 μm.

36. The thick-film processing system recited in claim 34 wherein the predetermined algorithm is optimized to control a vertical profile of the film.

37. The thick-film processing system recited in claim 34 wherein the predetermined algorithm is optimized to control a horizontal profile of the film.

38. The thick-film processing system recited in claim 34 wherein the instructions to change the process conditions are executed in response to a change in the parameter.

39. The thick-film processing system recited in claim 34 wherein the sensor comprises a reflectometer.

40. The thick-film processing system recited in claim 34 wherein the sensor comprises an ellipsometer.

41. The thick-film processing system recited in claim 34 wherein the sensor is configured to measure a stress of the film.

42. The thick-film processing system recited in claim 34 wherein the instructions for changing the process conditions are executed to maintain a substantially constant value for the optical property of the film throughout depositing the film.

43. The thick-film processing system recited in claim 34 wherein the instructions for changing the process conditions are executed to deposit the film with a desired variation in the optical property of the film.